Notes

Homework review

- I don't want any more turn-ins for Labs 1 thru 10 unless extreme circumstances. Please discuss with me
- People getting sloppy again with reading instructions e.g. does input come from command line, file, or keyboard
  - Read instructions line by line
  - Test!

Midterm review problem areas

- Post-fix operators ++, --
- Type conversions: int -> double, double -> int
- Some people struggling to design code for a problem

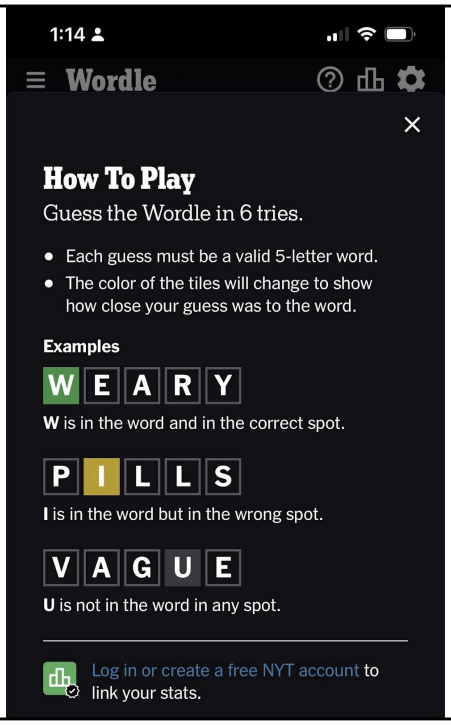
Monday a holiday – no class or office hours

Review FunnyCaps. Input word could have even or odd length!

CS112 –
Java
Programming

Project01

Fall 2022



Project01

Choice of two projects: first is “Wordle” word game

- Wordle a great project, I had fun solving it
- You implement Wordle game in Java for a human player
- Need good design, robustness to user mistakes

Second is Blackjack

- I estimate 4x as difficult as Wordle
- Only do it if you find homeworks easy, especially **MyCardDeck.java, Fractions.java**
- Your **Blackjack.java** program plays the game against a computer Dealer, no humans involved
- For top grade, your program must “play Blackjack well” i.e. smart bets and plays
- Slight reward for picking this: you can discard lowest HW grade and lowest Quiz grade

Both Projects

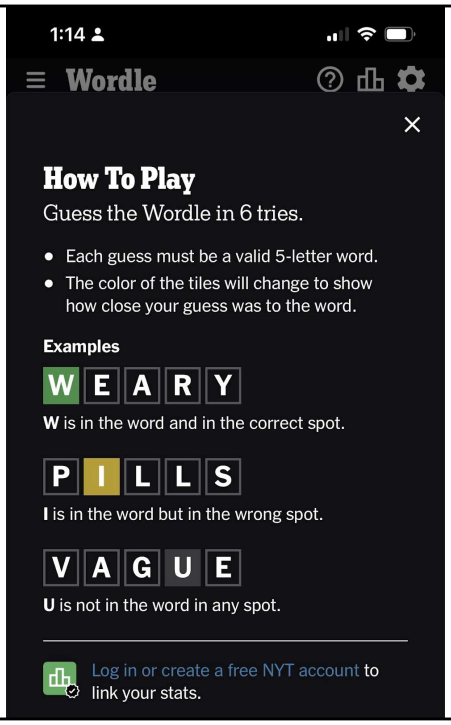
Two parts

- First part due in one week, preliminary software
- Second part due in two weeks
  - Robust code
  - 10 minute meeting with prof to present your design
  - Bring ½ to 1 page informal writeup of the test cases you ran and how you tested

No new homeworks until Project01 is due (Lab13 due Friday Oct 14)

Start right away! Email me your choice by end of Thursday

Wordle Overview



Wordle

We give you a text file **words.txt** with thousands of words

You write a `WordList` class that reads this file, saves only the 5-character words, and implements a method to return one of the words at random. **Hint:**

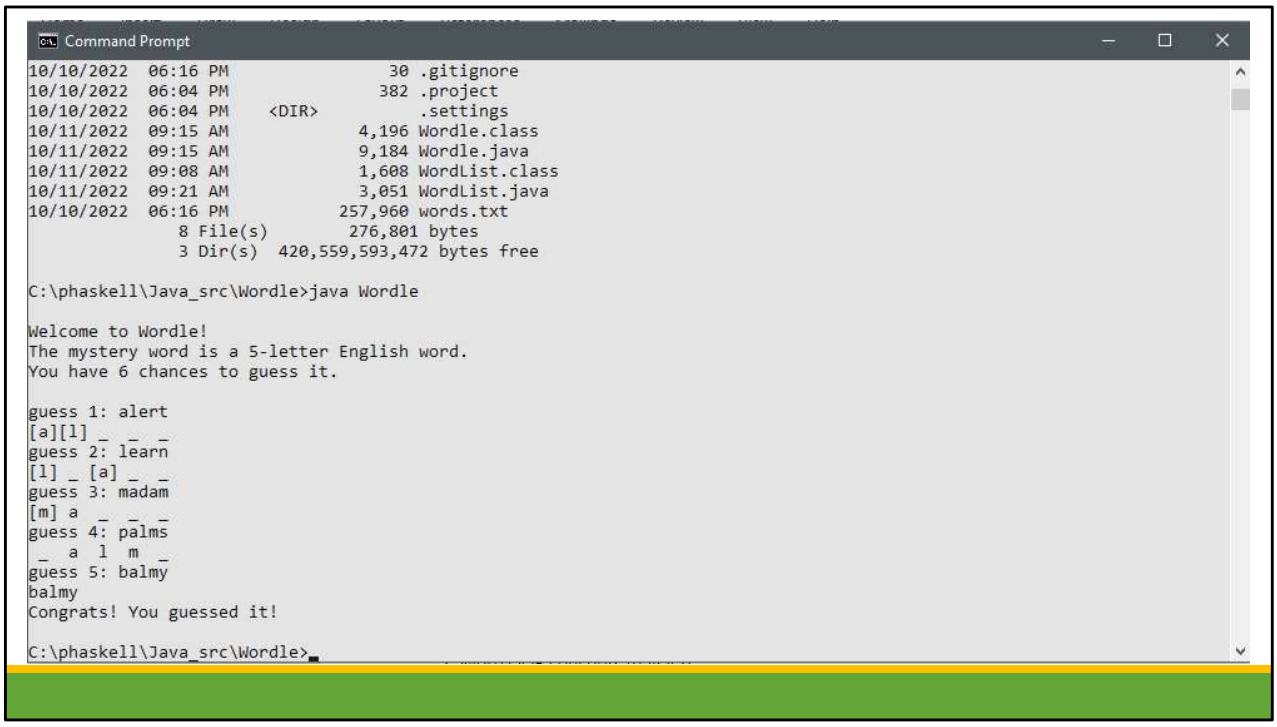
- `Math.random()` returns a random double between 0 and 0.99999999999999999
- `17*Math.random()` returns a random double between 0 and 16.99999999999999
- `(int) (17*Math.random())` returns a random int in the range [0, 16]

Wordle

You write a `Wordle` class that plays the Wordle game

- Pick a mystery word, using `WordList`
- Prompt the user to guess a 5-letter word
- For each character in the guess, if it matches the same character position in the mystery word, print out the character
- If a character in guess matches a character in the mystery word but in the wrong position, print it out in square brackets, e.g. [w]
- Otherwise, print out an underscore '_'
- Give the player 6 tries to guess the right word. Congratulate them if they guess it in time, otherwise tell them they lost and tell them the correct mystery word

Hard thing: deciding if characters in guess have a match, if there are >1 of same character in guess and/or mystery word


Command Prompt
10/10/2022 06:16 PM 30 .gitignore
10/10/2022 06:04 PM 382 .project
10/10/2022 06:04 PM <DIR> .settings
10/11/2022 09:15 AM 4,196 Wordle.class
10/11/2022 09:15 AM 9,184 Wordle.java
10/11/2022 09:08 AM 1,608 WordList.class
10/11/2022 09:21 AM 3,051 WordList.java
10/10/2022 06:16 PM 257,960 words.txt
8 File(s) 276,801 bytes
3 Dir(s) 420,559,593,472 bytes free
C:\phaskell\Java_src\Wordle>java Wordle
Welcome to Wordle!
The mystery word is a 5-letter English word.
You have 6 chances to guess it.
guess 1: alert
[a][l] _ _ _
guess 2: learn
[l] _ [a] _ _
guess 3: madam
[m] a _ _ _
guess 4: palms
_ a l m _
guess 5: balmy
balmy
Congrats! You guessed it!
C:\phaskell\Java_src\Wordle>

Blackjack Overview

We are going to play Blackjack by computer

A few things about Blackjack

- Multiple players all play against the dealer, not directly against each other
- Rules of Blackjack are in lab assignment—ask questions!
- I wrote software for the Dealer, you will write software for a Player
- Dealer and Player will communicate over the Internet via WiFi
  - Hopefully the room internet is good enough!

Usually 1-6 players. We will have up to 30

Blackjack

The tournament consists of multiple “hands”, hopefully multiple hands per second. I will have a GUI that shows how everyone is doing in terms of $$. You can print out info from your **Player.java** if you want more info about hands

If you are shy, GUI will show Avatar name rather than your real name.
If the tournament finishes quickly, we can kick off another one

Blackjack Play

The cards and points

- You can use your `Card` and `CardDeck` classes if you choose to
- But in Blackjack, cards have nonstandard values

Face cards all 10. Soft and Hard Aces: worth 11 or 1
So you will have to modify your earlier classes

Blackjack Play

Play

- Lots of cards showing
- Stand or Hit to get close to 21 without going over
- After each Player plays, then Dealer plays
- Blackjacks, busting, winning, and losing a hand

Blackjack Play

Intelligent Play

- Lots of cards worth 10
- Look at what you have and at what Dealer has, to see if you think you will win
- Lots of info on the Internet on strategies

Face cards. Soft and Hard Aces
If you have 19, should you hit?
If dealer has 16 and you have 15?

Winning and Losing Money

Normal bets

Player blackjack

What are the odds of winning on average?

So what should you bet to max your outcome? Zero. But we have a min bet of $1
Ever makes sense to be >$1? Yes, if probability of Blackjack is high
CARD COUNTING: casinos vs us

Blackjack Play

Two more Player options

- Split and Double

Only when have 1st two cards. Not after hitting or standing. Chance to increase your bet if you have a good hand!

Dealer <-> Player communications

Dealer <-> Player communications

Dealer sends commands to each Player, to place bets, make playing decisions, etc

- Player responds

Communication uses `DataInputStream` and `DataOutputStream`

- Not connected to a File but to an Internet Socket

Please don't have anything else running on the network! I don't know how loaded it will be

Internet Sockets

Every network-connected computer has 1+ "Internet Protocol" IP addresses

At start of tournament, I will share IP address of Dealer, and your Player will connect to it

Many services can share the same IP connection

- IP port: many services over same network. Port basically identifies the service (email, HTTP, video streaming, Blackjack, etc)

IP addrs not permanent. May change every time you connect to network. Also have HW ID that is permanent.
IP addresses are not unique across the world. Only per network.

You will enter BJ Port and Dealer IPaddr as cmd line args to your program.

For your testing, don't worry about testing with IP connection. Just test on your own computer.

Dealer <-> Player communications

The lab assignment gives you a few lines of SW to copy

- Creates IP socket, ties it to `DataInputStream`, `DataOutputStream`

Everyone will need WiFi connectivity

We will have ungraded test session next Weds where you can test connectivity

Please don't have anything else running on the network! I don't know how loaded it will be

Dealer <-> Player communications

The project document describes the commands and responses:

- Your Player should constantly try to read the `DataInputStream`
- When it gets a command, it decides how to respond and writes a response to the `DataOutputStream`
- Then it returns to trying to read the next command

To make things faster, during any one hand, the Dealer will communicate with all Players in parallel, not one-at-a-time.
But everyone needs to finish one hand before moving to the next. Dealer imposes a hard limit of 1 second response time or you are kicked out of tourney for slow play. Unless the network is a disaster, that shouldn't be hard.

The communication protocol

Commands

- login
- bet
- play
- status
- done

MORE DETAILS IN LAB WRITEUP
MOST COMMANDS NEED A RESPONSE

The communication protocol

Many commands send information along with the command

- Data separated with ':'
- Earlier we wrote a program to parse out words separated by ':' characters

Some of your replies will have data separated by ':' also

MORE DETAILS IN LAB WRITEUP

The communication protocol

Your Player is out of the tournament if

- It breaks the rules (e.g. betting $$ you don't have)
- Sends an illegal reply to a command
- Takes too long to respond
- Runs out of $$

MORE DETAILS IN LAB WRITEUP

Grading

Grading not based on performance in the tournament

- Tournament meant just to be fun and interesting

Separate automated grading evaluates your Player's decisions in a number of fixed situations, and on software and design quality

- Design quality – well designed SW
- Game quality – smart decisions on how to play
- 10 minute in-person meeting with TA's and/or me

Project due in Two Parts

Part 1: due Oct 19

- Program connects to Dealer over Internet
- Program responds correctly to "login" command
- Program always responds with a $1 bet to the "bet" command
- Program always responds with "stand" to the "play" command
- Program exits when receives "done" command

Part 2: due Oct 26

- Program plays intelligently: smart bet values
- Program plays intelligently: smart plays

Review session TONIGHT at 6:30: Lo Schiavo G12.

On how to play Blackjack, how to play well, and the program